has the chemistry of true solutions. The importance of surface tension in the mechanics of cell life has been emphasized, adsorption phenomena have recently become important in our consideration of semipermeability, selective absorption, etc., they must also be called upon to explain many of the relations between soil and plant. The student of protoplasmic structures, nuclear membranes, chromosomes, fibrillae, and the rest, is perhaps more familiar with coagulation of colloids and adsorption than he knows; his killing and fixing are examples of the former, while the whole process of staining apparently depends upon the different adsorptive powers exhibited by various portions of the coagulated protoplasmic mass. The so-called Brownian movement and the other phenomena of motion usually observed in the protoplasmic emulsion are likewise to be classed under capillary chemistry. If enzyme action is to receive an explanation, it bids fair to come also from this realm.

With this book and the field that it represents once in general use, it would seem that physiological research should receive a very great impetus along just those lines where it now wavers most. One of imagination, who appreciates the problems and present rapid advance of this and other branches of physical chemistry, should have little cause so thoroughly to lose heart as to need the aid of those "entelechies" and other *dei ex machina* with which the "neo-vitalism" seems to be somewhat overburdening biological philosophy. In the present exposition of capillary chemistry the author proceeds from the simpler phenomena of surface tension and capillarity to subjects of more complex nature, such as adsorption, colloidal solutions, suspensions, emulsions, catalysis, and the like. Every section is brief, clear, and directly to the point in hand; experimental evidence is given prominence rather than theoretical deductions, though the latter are not wanting; and numerous footnotes orient the reader in the scattered literature of the subject. An index of authors and one of subjects enhances the value of the work.—B. E. LIVINGSTON.

MINOR NOTICES

Insect galls.—Miss STEBBINS[4] has published a bulletin on insect galls of Springfield, Mass., and vicinity, which will be very useful to botanists who are interested in cecidology. The galls are grouped with reference to the plants, which have been arranged in accordance with BRITTON'S *Manual*. This is the first American work in which these pathological growths have been grouped with reference to the host plants. The record shows 204 species of gall-producing insects, which are distributed in 52 genera, 14 families, and 6 orders. The galls occur on 93 species of host plants, which are distributed among 48 genera, 29 families, and 16 orders. The descriptions of the galls are clear and are reinforced by 112 illustrations. The descriptions of the insects are omitted, but the synonomy and bibliography given with each will enable the student of entomology to look them up without difficulty. The galls of 26 new species are described and named,

[4] STEBBINS, FANNIE A., Springfield Museum of Natural History, Bulletin 2. 1910.

and 6 are described without names. The describing and naming of new species of galls without the insects has been the subject of considerable criticism, but since it gives us a definite record of these species the reviewer is inclined to favor the violation of this law of nomenclature. The work closes with an extensive bibliography, a systematic index of gall insects, and an index of scientific and common names of host plants.—MEL T. COOK.

NOTES FOR STUDENTS

Influence of environment on wheat.—One of the most persistent theories in evolutionary discussions of cultivated plants is that of the "breaking up of types," supposed to be brought about when plants are grown from seed under conditions differing markedly from those under which the parent plants were grown. Evidence for this view has been largely of an observational nature and capable of other interpretation. Experimental evidence bearing on the question has been brought out by LECLERC and LEAVITT[5] in reporting a series of cultures of wheat in widely different sections of the United States. The plan of the experiments was as follows: In one series Kubanka wheat grown in South Dakota was distributed to stations in Kansas and California, a sample being likewise grown in South Dakota. Every year a sample from each station was sent to each of the others and grown there. A similar series of cultures was carried out with Crimean wheat in Kansas, Texas, and California. Some of the experiments have now been continued for five years.

The results may be briefly summarized. The original pure type of Kubanka wheat from South Dakota showed entirely different morphological characteristics and chemical composition at the different stations. The characteristics of the wheats of one variety at any particular station were uniform for the wheat whenever grown at that station, no matter from which station the seed had been derived. Thus, when South Dakota wheat was grown in Kansas or California, it assumed characteristics different from those which it originally had, and peculiar for each region; but if, after several generations, these wheats were again transferred to South Dakota the resulting crop assumed all the characteristics of the same variety grown continuously in South Dakota. The series with Crimean wheat gave exactly similar results.

The experiments show that wheats of one variety from several sources, when grown in the same locality, differ but little in morphological characteristics and chemical composition, but if grown in different localities from seed of the same source, they differ widely from each other. There is a marked response to environment, but all the plants of a pure variety respond in the same way. There is no tendency toward "breaking up" of the type on account of change in environment.—H. HASSELBRING.

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5 LE CLERC, J. A., and LEAVITT, S., Tri-local experiments on the influence of environment on the composition of wheat. U.S. Dept. Agr., Bur. Chem., Bull. 128. pp. 18. 1910.